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LIMBACH & LIMBACH L.L.P.
2001 Ferry Building, San Francisco, CA 94111
415/433-4150

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08/909023
08/11/97

Assistant Commissioner for Patents
Washington, D.C. 20231

Attorney's Docket No. SONY-P7698

NEW APPLICATION TRANSMITTAL

SIR:

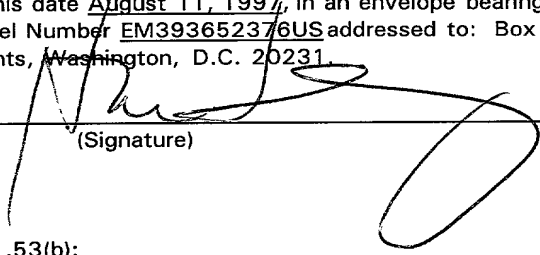
Transmitted herewith for filing is the patent application of Inventor(s): TOSHIAKI KOJIMA

Title: RECORDING, REPRODUCING, AND RECORDING/REPRODUCING APPARATUSES AND
METHODS THEREOF

CERTIFICATION UNDER 37 CFR § 1.10

I hereby certify that this New Application and the documents referred to as enclosed herein are being deposited with the United States Postal Service on this date August 11, 1997, in an envelope bearing "Express Mail Post Office To Addressee" Mailing Label Number EM393652376US addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

HOWARD WONG
(Name of person mailing paper)


(Signature)

Enclosed are:

1. The papers required for filing date under CFR § 1.53(b):
42 Pages of specification (including claims); 5 Sheets of drawings.
x formal
 informal
2. x Declaration or oath (unsigned)
3. x Power of Attorney (unsigned)
4. Assignment of the invention to Sony Corporation (including Form PTO-1595).
5. Fee Calculation
 Amendment changing number of claims or deleting multiple dependencies is enclosed.

CLAIMS AS FILED

	Number Filed	Number Extra	Rate	Basic Fee (\$770)
Total Claims	36 - 20	16	x \$22.00	\$352
Independent Claims	4 - 3	1	x \$80.00	\$80
<u>x</u> Multiple dependent claim(s), if any			\$260.00	\$260

*If less than zero, enter "0".

Filing Fee Calculation \$1462.00

08909023 "081197"

6. ☐ Small Entity Statement - verified statement enclosed

50% Filing Fee Reduction (if applicable) \$0

7. Other Fees

☐ Recording Assignment [\$40.00] \$0

☐ Other fees

Specify _____ \$0

Total Fees Enclosed \$1462.00

8. Payment of Fees

☒ Check(s) in the amount of \$1462.00 enclosed.

☐ Charge Account No. 12-1420 in the amount of \$.

A duplicate of this transmittal is attached.

9. ☒ Authorization to Charge Additional Fees

The Commissioner is hereby authorized to charge any additional fees (or credit any overpayment) associated with this communication and which may be required under 37 CFR § 1.16 or § 1.17 to Account No. 12-1420. **A duplicate sheet is attached.**

10. All correspondence regarding this application should be forwarded to the undersigned attorney:

Philip M. Shaw, Jr.
Limbach & Limbach L.L.P.
2001 Ferry Building
San Francisco, CA 94111
Telephone: 415/433-4150
Facsimile: 415/433-8716

11. ☐ Information Disclosure Statement

12. ☒ Return Receipt Postcard

13. ☒ Claim of priority in foreign application

14. ☒ Certified copy of Japanese Patent
Application No. P08-229308 f. 8/12/96

15. ☒ Preliminary Amendment

LIMBACH & LIMBACH L.L.P.

August 11, 1997

(Date)

(S97P103US00)

By: _____

Philip M. Shaw, Jr.

Registration No. 25,376

Attorney(s) or Agent(s) of Record

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of) Group Art Unit:
TOSHIAKI KOJIMA) Examiner:
Application No.) PRELIMINARY AMENDMENT
Filed: August 11, 1997) 2001 Ferry Bldg.
For: RECORDING,) San Francisco, CA 94111
REPRODUCING, AND) Ph.: 415-433-4150
RECORDING/REPRODUCING)
APPARATUSES AND)
METHODS THEREOF)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please preliminarily amend the above identified application as follows:

In the Claims

1. (Amended) A recording apparatus comprising:
recording means for recording input first data in a recording medium;
input means for inputting a start point and an end point of desired
second data out of said first data to be recorded or already recorded in said
recording medium by said recording means; and
control means, when said start point and end point of said second data
are designated through said input means, for controlling said recording means
so as to endlessly-record said first data in said recording medium while
avoiding the recording region of said recording medium in which said second
data has been recorded.

4. (Amended) The recording apparatus according to claim 3, wherein

said reproducing means reproduces said first data recorded in said recording medium after a passage of a predetermined period of time in order of recording said first data in said recording medium.

5. (Amended) The recording apparatus according to claim 1, wherein

said control means, when said recording means is controlled so as to [endless-record] endlessly-record said data in said recording medium, endlessly-records said first data in a first region of said recording medium, and when said start point and end point of said second data are input through said input means, controls said recording means so as to [endless-record] endlessly-record said first data in said first region while avoiding a predetermined second region out of said first region of said recording medium.

6. The recording apparatus according to claim 1, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium, and controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium.

7. (Amended) The recording apparatus according to claims 1 [and] or 3, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium; controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium; further controls said reproducing means so as to reproducing said assisting data recorded in said second region of said recording medium when reproducing said first data by said reproducing

means; and when said start point and end point of said second data are input by said input means, controls said recording means so as to generate said assisting data corresponding to said start point and end point and record said assisting data in said second region of said recording medium.

8. (Amended) The recording apparatus according to claim 6 [and/or claim 7], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded.

9. (Amended) A recording/reproducing apparatus for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprising:

recording means for recording input first data in said recording medium;

input means for inputting a start point and an end point of desired second data out of said first data to be recorded or already recorded in said recording medium by said recording means;

control means, when said start point and end point of said second data are input through said input means, for controlling said recording means so as to endlessly-record said first data in said recording medium while avoiding the recording region of said recording medium in which said second data has been recorded; and

reproducing means for reproducing and outputting said first data recorded in said recording medium.

12. (Amended) The recording/reproducing apparatus according to claim 9, wherein

said control means, when controlling said recording means so as to endlessly-record said first data in said recording medium, [endless-records]

endlessly-records said first data in a first region of said recording medium, and when said start point and end point of said second data are input through said input means, controls said recording means so as to endlessly-record said first data in said first region while avoiding a predetermined second region out of said first region of said recording medium (endlessly-recording in a predetermined region on a HD).

15. (Amended) The recording/reproducing apparatus according to claims 13 [and] or 14, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a size of said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded (contents of file system).

21. (Amended) The recording method according to claims 16 [and]
or 17, wherein:

said first step endlessly-records said first data in a first region of said recording medium, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when reproducing said first data, reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or "end point of said desired second data are/is input at first step, generates said assisting data corresponding to said start point and/or end point, and records said assisting data in said second region of said recording medium (file system renewal).

22. (Amended) The recording method according to claim 20 [and/or claim 21], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

28. (Amended) The recording/reproducing method according to claims 23 [and] or 24, wherein:

said first step endlessly-records said first data in a first region of said recording region, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when said first data is reproduced at said third step, also reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or end point of said desired second data are/is input at said first step, generates said assisting data corresponding to said start point and/or end point and records said assisting data in said second region of said recording medium (file system renewal).

29. (Amended) The recording/reproducing method according to claim 27 [and/or claim 28], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

Please add the following new claims:

30. The recording apparatus according to claim 7, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded.

31. The recording method according to claim 21, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a

head address of said recording medium in which said first and/or second data has been recorded.

32. The recording/reproducing method according to claim 28, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

REMARKS

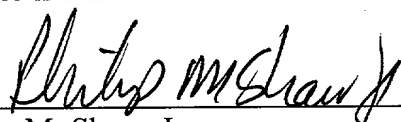
The claims have been amended to correct incorrect dependencies and to correct indefiniteness and grammatical errors.

It is submitted that all of the claims are in condition for allowance and the Examiner's early examination and consideration are respectfully requested.

Respectfully submitted,

LIMBACH & LIMBACH L.L.P.

By:


Philip M. Shaw, Jr.
Reg. No. 25,376

August 11, 1997
Our File: SONY-P7698

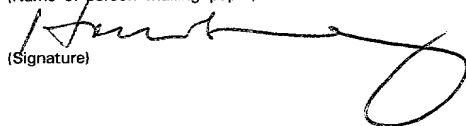
EXPRESS MAIL CERTIFICATE

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HOWARD WONG

(Name of person mailing paper)

(Signature)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)	Group Art Unit:
)	
TOSHIAKI KOJIMA)	Examiner:
)	
Application No.)	<u>PRELIMINARY AMENDMENT</u>
)	
Filed: August 11, 1997)	2001 Ferry Bldg.
)	San Francisco, CA 94111
For: RECORDING,)	Ph.: 415-433-4150
REPRODUCING, AND)	
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METHODS THEREOF)	

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please preliminarily amend the above identified application as follows:

In the Claims

1. (Amended) A recording apparatus comprising:
recording means for recording input first data in a recording medium;
input means for inputting a start point and an end point of desired
second data out of said first data to be recorded or already recorded in said
recording medium by said recording means; and
control means, when said start point and end point of said second data
are designated through said input means, for controlling said recording means
so as to endlessly-record said first data in said recording medium while
avoiding the recording region of said recording medium in which said second
data has been recorded.

4. (Amended) The recording apparatus according to claim 3, wherein

said reproducing means reproduces said first data recorded in said recording medium after a passage of a predetermined period of time in order of recording said first data in said recording medium.

5. (Amended) The recording apparatus according to claim 1, wherein

said control means, when said recording means is controlled so as to [endless-record] endlessly-record said data in said recording medium, endlessly-records said first data in a first region of said recording medium, and when said start point and end point of said second data are input through said input means, controls said recording means so as to [endless-record] endlessly-record said first data in said first region while avoiding a predetermined second region out of said first region of said recording medium.

6. The recording apparatus according to claim 1, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium, and controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium.

7. (Amended) The recording apparatus according to claims 1 [and] or 3, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium; controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium; further controls said reproducing means so as to reproducing said assisting data recorded in said second region of said recording medium when reproducing said first data by said reproducing

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means; and when said start point and end point of said second data are input by said input means, controls said recording means so as to generate said assisting data corresponding to said start point and end point and record said assisting data in said second region of said recording medium.

8. (Amended) The recording apparatus according to claim 6 [and/or claim 7], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded.

9. (Amended) A recording/reproducing apparatus for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprising:

recording means for recording input first data in said recording medium;

input means for inputting a start point and an end point of desired second data out of said first data to be recorded or already recorded in said recording medium by said recording means;

control means, when said start point and end point of said second data are input through said input means, for controlling said recording means so as to endlessly-record said first data in said recording medium while avoiding the recording region of said recording medium in which said second data has been recorded; and

reproducing means for reproducing and outputting said first data recorded in said recording medium.

12. (Amended) The recording/reproducing apparatus according to claim 9, wherein

said control means, when controlling said recording means so as to endlessly-record said first data in said recording medium, [endless-records]

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endlessly-records said first data in a first region of said recording medium, and when said start point and end point of said second data are input through said input means, controls said recording means so as to endlessly-record said first data in said first region while avoiding a predetermined second region out of said first region of said recording medium (endlessly-recording in a predetermined region on a HD).

15. (Amended) The recording/reproducing apparatus according to claims 13 [and] or 14, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a size of said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded (contents of file system).

21. (Amended) The recording method according to claims 16 [and] or 17, wherein:

said first step endlessly-records said first data in a first region of said recording medium, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when reproducing said first data, reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or "end point of said desired second data are/is input at first step, generates said assisting data corresponding to said start point and/or end point, and records said assisting data in said second region of said recording medium (file system renewal).

22. (Amended) The recording method according to claim 20 [and/or claim 21], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

28. (Amended) The recording/reproducing method according to claims 23 [and] or 24, wherein:

said first step endlessly-records said first data in a first region of said recording region, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when said first data is reproduced at said third step, also reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or end point of said desired second data are/is input at said first step, generates said assisting data corresponding to said start point and/or end point and records said assisting data in said second region of said recording medium (file system renewal).

29. (Amended) The recording/reproducing method according to claim 27 [and/or claim 28], wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

Please add the following new claims:

30. The recording apparatus according to claim 7, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded.

31. The recording method according to claim 21, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a

head address of said recording medium in which said first and/or second data has been recorded.

32. The recording/reproducing method according to claim 28, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

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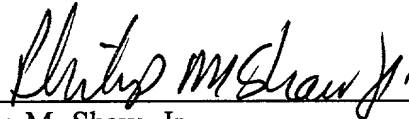
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By:


Philip M. Shaw, Jr.
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HOWARD WONG

(Name of person mailing paper)

(Signature)



RECORDING, REPRODUCING, AND
RECORDING/REPRODUCING APPARATUSES AND METHODS THEREOF

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to recording, reproducing, and recording/reproducing apparatuses and methods thereof, and more particularly, is suitably applied to a recording apparatus and a recording method for endlessly-recording image data and/or voice data (hereafter, referred to as AV data) in a recording medium.

DESCRIPTION OF THE RELATED ART

In this type of recording apparatus, for example, a tape recording medium is used as a recording medium. In this case, in the recording apparatus, the recording apparatus makes it possible to endlessly-record AV data to be recorded by repeating a series of operations such as recording the AV data from one end to the other end of a tape recording medium, then rewinding the tape recording medium, and recording the AV data from one end to the other end of the tape recording medium again.

However, in the recording apparatus using the tape recording medium, it is necessary to rewind the tape recording medium whenever recording the AV data up to the other end of the tape recording medium and thereby, the endless-recording operation of the AV data

becomes troublesome.

Therefore, in this type of recording apparatus, by connecting one end and the other end of the recording medium to form the recording medium like a ring, the AV data can be continuously endlessly-recorded in the ring-formed tape recording medium without rewinding the recording medium as described above.

Moreover, in this type of recording apparatus, there is a recording apparatus using a disc recording medium as a recording medium, in which the AV data is continuously endlessly-recorded by repeating the operations of recording the AV data in the AV data recording region of the disc recording medium from the head up to the end of the region and then recording the data in the region from the head up to the end of the region again.

However, in the aforementioned various types of recording apparatuses, the AV data is endlessly-recorded by successively overwriting the AV data returning from the ending point to the starting point of the AV data recording region on the recording medium (tape recording medium or disc recording medium). Therefore, there is a problem that the current recorded AV data is lost because of overwriting if the recording medium goes around and returns. In order to avoid overwriting of the AV data recorded in the recording medium, the recording medium has to be replaced. However, if it takes time to replace the recording medium, the desired AV data can not be recorded.

SUMMARY OF THE INVENTION

In view of the foregoing, and objet of this invention is to provide a recording apparatus and a recording method in which second data can be easily stored while endlessly-recording first data in a recording medium.

The foregoing object and other objects of the invention have been achieved by the provision of a recording apparatus, which comprises a recording means for recording input first data in a recording medium, an input means for inputting a start point and end point of desired second data out of the first data to be recorded or already recorded in the recording medium by the recording means, and a control means, when the start point and end point of the second data are designated through the input means, for controlling the recording means so as to endlessly-record the first data in the recording medium while avoiding the recording region of the recording medium in which the second data has been recorded.

Further, in the present invention, a recording/reproducing apparatus for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprises a recording means for recording input first data in the recording medium, an input means for inputting a start point and end point of desired second data out of the first data to be recorded or already recorded in the recording medium by the recording means, a control means, when the start point and end point of the second data are input through the input means, for controlling the recording

means so as to endlessly-record the first data in the recording medium while avoiding the recording region of the recording medium in which the second data has been recorded, and a reproducing means for reproducing and outputting the first data recorded in the recording medium.

Further in the present invention, a recording method for recording input first data in a recording medium capable of non linear access, comprises a first step of endlessly-recording the first data in the recording medium and inputting a start point and/or end point of desired second data out of the first data to be recorded or already recorded in the recording medium, and a second step, when the start point and/or end point of the desired second data are/is input at the first step, of endlessly-recording the first data in the recording medium while avoiding a recording region of the recording medium in which the second data corresponding to the start point and/or end point out of the first data has been recorded.

Furthermore, in the present invention, a recording/reproducing method for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprises a first step of endlessly-recording input first data in the recording medium, and inputting a start point and/or end point of desired second data out of first data to be recorded or already recorded in the recording medium, a second step, when the start point and/or end point of the desired second data are input at first

step, of endlessly-recording the first data in the recording medium while avoiding a recording region of the recording medium in which second data corresponding to the start point and/or end point out of the first data has been recorded, and a third step of reproducing and outputting the first data recorded in the recording medium.

The nature, principle and utility of the invention will become more apparent from the following detailed description when read in conjunction with the accompanying drawings in which like parts are designated by like reference numerals or characters.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 is a block diagram showing an embodiment of a recording/reproducing apparatus of the present invention;

Fig. 2 is a schematic diagram showing the structure of a hard disk;

Figs. 3A and 3B are schematic diagrams explaining recording of first AV data in an AV data recording area of the hard disk;

Fig. 4 is a schematic diagram explaining storage of second AV data in the AV data recording region of the hard disk;

Figs. 5A and 5B are block diagrams explaining endless recording of the first AV data; and

Fig. 6 is a flow chart showing an endless recording procedure.

DETAILED DESCRIPTION OF THE EMBODIMENT

Preferred embodiments of this invention will be described with reference to the accompanying drawings:

In Fig. 1, symbol 1 denotes a recording/reproducing apparatus as a whole, which is constituted so that a plurality of AV data D1 to be recorded (hereinafter, AV data to be recorded is referred to as first AV data) can be recorded and reproduced and the first AV data D1 can be endlessly-recorded by controlling the whole of the recording/reproducing apparatus by a system controller 2.

First, when the recording/reproducing apparatus 1 records the first AV data D1, a user operates a control panel 4 to designate a recording mode and thereby, a recording mode signal S1 is transmitted to the system controller 2 from the control panel 4.

The system controller 2 supplies a video signal and/or audio signal (hereafter, these signals are referred to as AV signals) S2 corresponding to an image and/or voice to be recorded from the outside to an encoder 5 on the basis of the input recording mode signal S1. In addition, the system controller 2 includes a time code generator (not shown) and transmits a time code (e.g. time information corresponding to 24-hr cycle) generated by the time code generator to the encoder 5 as a time code signal S3.

The encoder 5 adds the time code represented by the time code signal S3 to the input AV signal S2 in order to digitize the signal S2, generates the first AV data D1 by encoding the signal S2, and transmits the first AV data D1 to a format converter 6.

Moreover, in this case, the system controller 2 transmits a

recording control signal S5 to a central processing unit (CPU) 8 through a first internal bus 7. Thereby, the CPU 8 is controlled based on the input recording control signal S5 to transmit a data format conversion control signal S6 to the format converter 6 through a second internal bus 9.

Thereby, the format converter 6 successively packets the first AV data D1 for every unit corresponding to the data quantity in a sector of a hard disk 15 to convert the data D1 into a recording format for the hard disk 15, and transmits the data D1 to a buffer memory 16. Note that, the format converter 6 extracts the time codes respectively added to the head position and the tail position of the first AV data D1 when packeting the first AV data D1, and transmits the time codes to the CPU 8 through the second internal bus 9 as time code information signals S7.

In this time, the CPU 8 transmits a buffer control signal S8 for controlling a buffer memory controller 17 to the buffer memory controller 17 through the second internal bus 9.

The buffer memory controller 17 is controlled based on the input buffer control signal S8 to transmit a buffer memory control signal S10 for controlling storage and transmission of the AV data D1 to the buffer memory 16.

Thereby, the buffer memory 16 successively stores the first AV data D1 for every packet on the basis of the input buffer memory control signal S10, and successively transmits the stored first AV data D1 for every packet at a predetermined timing to the hard disk

15 through a first direct memory access (DMA) bus 20, a small computer system interface (SCSI) controller 21, and a second DMA bus 22 in order.

Moreover, the CPU 8 transmits a logical address (LBA: logical block address) of a sector of the hard disk 15 in which the first AV data D1 is recorded for every packet, to the hard disk 15 as a logical address signal S12 through the second internal bus 9, the SCSI controller 21, and the second DMA bus 22 in order. Thereby, the CPU 8 is constituted so as to be capable of successively recording the first AV data D1 in each corresponding sector (corresponding to the logical address) of the hard disk 15 for every packet.

In this time, a file name designated by a user and corresponding to the first AV data D1 is input to the system controller 2 from the control panel 4 as a file name information signal S14 and moreover, the time code information signal S7 is input to the system controller 2 from the CPU 8 through the first internal bus 7. Thereby, the system controller 2 makes the file name of the first AV data D1 which is recorded in the hard disk 15 respectively correspond to the time codes respectively added to the head position and the tail position of the first AV data D1, and records the first AV data D1 in the hard disk 15.

Moreover, the system controller 2 transmits the input file name information signal S14 to the CPU 8 through the first internal bus 7.

Thereby, the CPU 8 generates file data D2 for identifying the first AV data D1 on the basis of the file name information signal S14, the time code information signal S7, and the logical address signal S12. In this connection, the file data D2 comprises the file name corresponding to the first AV data D1, end time of recording of the first AV data D1, a logical address (that is, record entry information) of the head of the recording region of the first AV data D1, size of the first AV data D1 (number of sectors required to record the first AV data D1), and the time code added to the head position of the first AV data D1.

Thus, the CPU 8 is constituted so as to be capable of transmitting thus generated file data D2 to the hard disk 15 through a CPU bus 25, a random access memory (RAM) 26, the SCSI controller 21, and the second DMA bus 22 in order and recording the file data D2 in the hard disk 15.

Therefore, in the recording/reproducing apparatus 1, when the first AV data D1 is recorded, a plurality of first AV data D1 and a plurality of file data D2 for identifying the first AV data D1 can be recorded by repeating a series of aforementioned operations when recording the first AV data D1.

The hard disk 15, as shown in Fig. 2, is formed into a disc shape and set in a predetermined case 27 and for example, a file data recording region 15A is formed along the outermost track of the hard disk 15 and moreover, an AV data recording region 15B is formed inside of the AV data recording region 15A. In the example shown in

Fig. 2, the file data recording region 15A is formed on the outermost track and the file data recording region 15B is formed on the inside track. However, the file data recording region 15A may be formed on the inside track of the hard disk 15 and the AV data recording region 15B may be formed on the outside track. Further, recording regions may be respectively formed on predetermined regions. Thus, the hard disk 15 can record a plurality of file data D2 in the file data recording region 15A and moreover record a plurality of first AV data D1 in the AV data recording region 15B.

Moreover, as shown in Fig. 3A, the whole of the AV data recording region 15B of the hard disk 15 serves as a first recording region FS until the first AV data D1 is recorded correspondingly to the file data D2. That is, when nothing is recorded in the AV data recording region 15B, the whole of the AV data recording region 15B is a free space (FS) as shown in Fig. 3A. When the first AV data D1 respectively corresponding to a plurality of file data D2 are recorded in the AV data recording region 15B of the hard disk 15, as shown in Fig. 3B, the AV data D1 based on the file data D2 are respectively recorded in the second recording regions RE1, RE2, and RE3 on the basis of the logical address (record entry) information of the head of the recording region, in which the AV data D1 is recorded, in the file data D2.

On the other hand, in the recording/reproducing apparatus 1 shown in Fig. 1, when the first AV data D1 is reproduced, a user operates the control panel 4 to designate the reproduction mode and

thereby, a reproduction mode signal S20 is transmitted to the system controller 2 from the control panel 4. The system controller 2 transmits a file data read control signal S21 to the CPU 8 through the first internal bus 7 on the basis of the input reproduction mode signal S20. The CPU 8 controls the hard disk 15 on the basis of the input file data read control signal S21 to read all the file data D2 recorded in the hard disk 15 from the hard disk 15 to the RAM 26 through the second DMA bus 22 and the SCSI controller 21 in order.

Under the above state, the user operates the control panel 4 to designate a file name corresponding to desired first AV data D1 (that is, first AV data D1 corresponding to a desired image and/or voice to be reproduced) and thereby, the control panel 4 transmits a file name designation signal S25 to the system controller 2.

The system controller 2 reads a time code corresponding to the designated file name from a recording medium in the system controller 2 on the basis of the input file name designation signal S25 and transmits the file name designation signal S25 to the CPU 8 through the first internal bus 7.

The CPU 8 transmits a retrieval signal S27 to the RAM 26 on the basis of the input file name designation signal S25. Thereby, the CPU 8 retrieves the file names of a plurality of file data D2 stored in the RAM 26 to read file data D2 having a file name designated by the user.

In this time, the user operates the control panel 4 again to designate a reproduction start time for a desired first AV data

value D1 (time from the head position of the first AV data D1 up to start of reproduction). The control panel 4 transmits a reproduction start signal S30 representing the designated reproduction start time to the system controller 2.

The system controller 2 selects the time code of first AV data D1 corresponding to the reproduction start time represented by the reproduction time signal S30 on the basis of the time codes of the head position and tail position of the desired first AV data D1 to transmit the selected time code to the CPU 8 through the first internal bus 7 as a time code signal S31.

The CPU 8, on the basis of the time code (time code of starting reproduction) represented by the input time code signal S31 and the logical address of the head of the recording region of the first AV data D1 stored in the file data D2 having a file name designated by the user, computes a logical address for starting the reproduction of the first AV data value D1 corresponding to the time code, and then transmits thus obtained logical address and the logical address for every packet up to the tail of the first AV data D1 to the hard disk 15 as logical address signals S34 through the second internal bus 9, the SCSI controller 21, and the second DMA bus 22 in order. Thereby, the CPU 8 successively reproduces the desired AV data D1 recorded in the hard disk 15, for every packet to transmit the data D1 to the buffer memory 16 through the second DMA bus 22, the SCSI controller 21, and the first DMA bus 20 in order.

In this time, the CPU 8 transmits a buffer control signal S35

for controlling the buffer memory controller 17 to the buffer memory controller 17 through the second internal bus 9.

The buffer memory controller 17 is controlled based on the input buffer control signal S35 to transmit a buffer memory control signal S37 for controlling storage and transmission of the first AV data D1 to the buffer memory 16.

Thereby, the buffer memory 16 successively stores the first AV data D1 for every packet on the basis of the input buffer memory control signal S37 and successively transmits the stored first AV data D1 to a format restorer 30 for every packet at a predetermined timing.

In this case, a data format restoration control signal S39 is input together with the first AV data D1 to the format restorer 30 from the CPU 8 through the second internal bus 9. Thereby, the format restorer 30 restores the input and packeted first AV data D1 on the basis of the data format restoration control signal S39 (that is, the first AV data D1 is returned to the format before packeted) and transmits the data D1 to a decoder 32.

The decoder 32 generates an AV signal S40 from the input first AV data D1, and then transmits the AV signal S40 to external units (e.g. predetermined display unit and speaker) and also to a time code extractor 34.

The time code extractor 34 extracts a time code attached to the input AV signal S40 from the signal S40 and transmits the time code to the system controller 2 as an extracted time code signal S42.

Thus, in the recording/reproducing apparatus 1, when the first AV data D1 is reproduced, images and/or voices corresponding to desired first AV data D1 can be reproduced from a desired position by repeating the aforementioned series of operations.

In this case, in the recording/reproducing apparatus 1, a user operates the control panel 4 to designate the endless-recording mode when endlessly-recording the first AV data D1. Thereby, an endless-recording mode signal S44 is transmitted to the system controller 2 from the control panel 4, and the system controller 2 controls the whole of the apparatus on the basis of the input endless-recording mode signal S44 to supply the AV signal S2 to the encoder 5 from an external unit and moreover transmit the time code signal S3 to the encoder 5 from the internal time code generator.

The encoder 5 adds a time code represented by the time code signal S3 to the input AV signal S2 to encode the signal S2. Thereby, the encoder generates the first AV data D1 to transmit the first AV data D1 to the format converter 6.

The format converter 6 converts the first AV data D1 into a recording format for the hard disk 15 by successively packeting the first AV data D1 every unit corresponding to the data quantity of a sector of the hard disk 15 on the basis of the data format conversion control signal S6 input from the CPU 8 in order to transmit the format to the buffer memory 16 and moreover, extracts the time codes respectively added to the head position and the tail position of the first AV data D1 and transmits them to the CPU 8

through the second internal bus 9 as the time code information signal S7.

The CPU 8 transmits the buffer control signal S8 to the buffer memory controller 17 through the second internal bus 9. Then, the buffer memory controller 17 transmits the buffer memory control signal S10 to the buffer memory 16 on the basis of the input buffer control signal S8.

The buffer memory 16 successively stores the first AV data D1 for every packet on the basis of the input buffer memory control signal S10 and successively transmits the stored first AV data D1 to the hard disk 15 for every packet at a predetermined timing through the first DMA bus 20, the SCSI controller 21, and the second DMA bus 22 in order.

In this case, the CPU 8 under endless recording is constituted so as to endlessly-record the first AV data D1 only in first recording regions FS1 to FS3 of the AV data recording region 15B of the hard disk 15 (Fig. 3B) (that is, so as to avoid the second recording regions RE1 to RE3 (Fig. 3B) in which the AV data D1 is recorded correspondingly to the file data D2). Therefore, the CPU 8 successively transmits a logical address for each sector, from the sector located at the head of the first recording region FS1 (Fig. 3B) of the AV data recording region 15B of the hard disk 15 while successively avoiding the second recording region RE1 to RE3 (Fig. 3B) up to the sector located at the tail of the first recording region FS3 (Fig. 3B), to the hard disk 15 as a logical address

signal S45 through the second internal bus 9, the SCSI controller 21, and the second DMA bus 22 in order and then, repeatedly transmits the logical address signal S45 to the hard disk 15. Therefore, the CPU 8 is constituted so as to be capable of endlessly-recording a plurality of first AV data D1 only in the first recording regions FS1 to FS3 (Fig. 3B) of the AV data recording region 15B of the hard disk 15.

Under the above state, as shown in Fig. 4 in which portions corresponding to those in Fig. 1 are provided with the same symbol, in the recording/reproducing apparatus 1, a user operates the control panel 4 to designate a file name corresponding to desired second AV data D4 out of the first AV data D1 and thereby, a file name signal S50 representing the file name is transmitted to the system controller 2 from the control panel 4.

In this case, the system controller 2 records the file name represented by the input file name signal S50 in the recording medium.

In addition, in the recording/reproducing apparatus 1, the user operates the control panel 4 to designate the reproduction of the first recording regions FS1 to FS3 (Fig. 3B) of the AV data recording region 15B of the hard disk 15 and thereby, a reproduction designation signal S51 is transmitted to the system controller 2 from the control panel 4.

The system controller 2 transmits a reproduction start signal S53 for controlling the CPU 8 to the CPU 8 through the first

internal bus 7 on the basis of the input reproduction designation signal S51.

Thereby, the CPU 8 is controlled based on the input reproduction start signal S53 to successively reproduce the first AV data D1 endlessly-recorded in the first recording regions FS1 to FS3 (Fig. 3B) of the AV data recording region 15B of the hard disk 15, in recorded order after a predetermined time. Further, the CPU 8 repeatedly transmits the logical address as a logical address signal S54 for every sector to the hard disk 15 through the second internal bus 9, the SCSI controller 21, and the second DMA bus 22 in order.

Thus, the CPU 8 endlessly-records a plurality of first AV data D1 in the first recording regions FS1 to FS3 (Fig. 3B) of the AV data recording regions 15B of the hard disk 15 and at the same time, successively reproduces the recorded first AV data D1 without overlapping with the first AV data D1 to be endlessly-recorded and transmits the recorded first AV data D1 to the buffer memory 16 through the second DMA bus 22, the SCSI controller 21, and the first DMA bus 20 in order.

Moreover, the CPU 8 transmits the logical address signal S54 transmitted to the hard disk 15, also to the system controller 2.

Thus, the recording/reproducing apparatus 1 transmits the first AV data D1 of the first recording region reproduced from the hard disk 15, to the decoder 32 by the same processing as the case when reproducing the aforementioned first AV data D1. The decoder 32 converts the input first AV data D1 of the first recording region

into analog data and transmits the data to external units and also to the time code extractor 34.

The time code extractor 34 extracts a time code from the input AV signal S40 and transmits the time code to the system controller 2 as the extracted time code signal S42.

In this case, a predetermined display unit and a speaker are connected to the output side of the decoder 32, therefore the recording/reproducing apparatus 1 allows a user to look at and/or listen to images and/or voices corresponding to the AV signal S40 transmitted from the decoder 32, through the display unit and/or the speaker.

Under the above state, the recording/reproducing apparatus 1 allows the user to look at and/or listen to the images and/or voices and recognize the contents. When reproduction of a desired image and/or voice is started, the recording/reproducing apparatus 1 allows the user to operate the control panel 4 and designate the start point. In this time, a start point signal S55 representing that the start point is designated is input to the system controller 2 from the control panel 4 and thereby, the logical address and the time code input simultaneously with the start point signal S55 (that is, when the user designates the start point) are recorded in the recording medium.

The recording/reproducing apparatus 1 allows the user to look at and/or listen to a desired image and/or voice and recognize the contents. When reproduction of the desired image and/or voice ends,

the recording/reproducing apparatus 1 allows the user to operate the control panel 4 and designate the end point. In this time, an end point signal S56 representing that the end point is designated is input to the system controller 2 from the control panel 4 and thereby, the logical address and the time code input simultaneously with the end point signal S56 (that is, when the user designates the end point) are recorded in the recording medium.

Thereby, the user operates the control panel to designate the execution of storage of the second AV data D4 corresponding the desired image and voice of which the start point and end point are designated, and thereby a storage execution signal S57 is input from the control panel. The system controller 2, on the basis of the storage execution signal S57, reads the file name corresponding to the second AV data D1, the logical address and time code when the start point is designated, and the logical address and time code when the end point is designated from the recording medium in accordance with a storage execution signal S57, and transmits them to the CPU 8 as file data generation information signals S60 through the first internal bus 7.

The CPU 8 generates file data D5 for identifying the second AV data D4 corresponding to the desired image and/or voice of which start and end points are designated, on the basis of the input file data generation information signal S60, transmits the data D5 to the hard disk 15 through the CPU bus 25, the RAM 26, the SCSI controller 21, and the second DMA bus 22 in order, and records the file data D5

in the file data recording region 15A of the hard disk 15.

Thereby, as shown in Figs. 5A and 5B in which portions corresponding to those in Figs. 3A and 3B are provided with the same symbol, the recording/reproducing apparatus 1, while avoiding a predetermined region 50 (Fig. 5A), in which the second AV data D4 of which start and end points are designated is recorded out of a plurality of the first AV data D1 recorded in the first recording region FS4 of the AV data recording region 15B in the hard disk 15, is constituted so as to store the second AV data D4 recorded in a second recording region RE2 (Fig. 5B) with the predetermined region 50 as the second recording region RE2 in which the first AV data D1 is endlessly-recorded.

In the aforementioned configuration, in the recording/reproducing apparatus 1, when a user operates the control panel 4 to designate an endless-recording mode, the system controller 2 starts an endless-recording procedure RT1 shown in Fig. 6, proceeds from step SP1 to step SP2, and controls the CPU 8 to endlessly-record a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15.

Then, the system controller 2 proceeds to step SP3 and judges whether or not the first AV data D1 is endlessly-recorded. When an affirmative result is obtained, the system controller 2 proceeds to the following step SP4 to record a file name corresponding to the second AV data D4 designated by operating the control panel 4 by the

user.

Thereafter, the system controller 2 proceeds to step SP5. When the user operates the control panel 4 to designate the reproduction of the first recording region of the AV data recording region 15B of the hard disk 15, the controller 2 controls the CPU 8 to successively reproduce the first AV data D1 recorded in the first recording region of the AV data recording region 15B of the hard disk 15.

Then, the system controller 2 proceeds to step SP6, allows the user to look at and/or listen to the contents of images and/or voices corresponding to the first AV data D1 obtained from the first recording region through the display unit and/or speaker and thereby, allows the user to recognize the contents of the images and/or voices and search a desired image and/or voice.

Then, the system controller 2 proceeds to step SP7, judges whether or not the start and end points corresponding to the desired image and/or voice are designated by recognizing the desired image and/or voice and operating the control panel 4 by the user. When a negative result is obtained, the system controller 2 returns to step SP6 and thereafter, repeats a loop of steps SP6 to SP7 until an affirmative result is obtained at step SP7.

Then, when an affirmative result is obtained at step SP7, the system controller 2 judges at step SP8 whether or not execution of storage of the second AV data D4 corresponding to the desired image and/or voice of which start and end points are designated is

designated by operating the control panel 4 by the user. When a negative result is obtained, the system controller 2 repeats step SP8 until an affirmative result is obtained.

Thereafter, when an affirmative result is obtained at step SP8, the system controller 2 proceeds to the following step SP9, transmits the file name corresponding to the second AV data D4 and the logical address and time code when the start and end points are designated to the CPU 8 as file data generation information signals S60. Then, the CPU 8 generate file data D5 on the basis of the file data generation information signals S60, and the file data D5 is recorded in the file data recording region 15A of the hard disk 15. Thereby, the system controller 2 stores the second AV data D4 recorded in the first recording region of the AV data recording region 15B and thereafter, returns to step SP3.

In this way, the system controller 2 repeats a loop of SP3-SP4-SP5-SP6-SP7-SP8-SP9-SP3 while endlessly-recording the first AV data D1 until a negative result is obtained at step SP3, and when the second AV data D4 is recorded together with a plurality of endlessly-recorded first AV data values D1, successively stores the second AV data D4.

Thereafter, when a negative result is obtained at step SP3, the system controller 2 judges that endless-recording of the first AV data D1 finishes and proceeds to the following step SP10 to complete the endless-recording procedure RT1.

Therefore, the recording/reproducing apparatus 1 comprises the

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CPU 8 for endlessly-recording a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15 and moreover successively reproducing the recorded first AV data D1, the control panel 4, when a desired image and/or voice are/is reproduced out of images and/or voices corresponding to the reproduced first AV data D1, for inputting the start and end points of the desired image and/or voice, and the system controller 2 for controlling the CPU 8 so as to endlessly-record a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15 on the basis of the start and end points while avoiding the recording region for the second AV data D4 corresponding to the desired image and/or voice. Thereby, it is possible to store the second AV data D4 together with the first AV data D1 without replacing the hard disk 15 even if the second AV data D4 is endlessly-recorded in the first recording region of the AV data recording region 15B of the hard disk 15.

In addition, the recording/reproducing apparatus 1 makes it possible to store the second AV data D4 while endlessly-recording the first AV data D1 without changing the structure of the AV data recording region 15B of the hard disk 15.

On the other hand, in a recording method using the recording/reproducing apparatus 1, the first AV data D1 recorded in the first recording region of the AV data recording region 15B of the hard disk 15 is reproduced while endlessly-recording a plurality of first AV data D1 in the first recording region, a user looks at,

listens to, and recognizes the contents of images and/or voices corresponding to the reproduced first AV data D1 and then designates the start and end points of a desired image and/or voice when the desired image and/or voice are/is reproduced, and the first AV data D1 is endlessly-recorded on the basis of the designated start and end points while avoiding the recording region for the second AV data D4 corresponding to the desired image and/or voice in the first recording region of the AV data recording region 15B of the hard disk 15. Thereby, the second AV data D4 can be easily stored without replacing the hard disk 15 (that is, a recording medium).

Further, in the recording method, a plurality of first AV data D1 is endlessly-recorded in the first recording region of the AV data recording region 15B of the hard disk 15 and moreover the first AV data D1 recorded in the first recording region is reproduced, and then a user looks at, listens to, and recognizes the contents images and/or voices corresponding to the reproduced first AV data D1 to designate the start point and end point of a desired image and/or voice when the desired image and/or voice are/is reproduced, Thereby, the desired image and/or voice can be easily selected.

Furthermore, in the recording method, the AV first data D1 is reproduced after a predetermined time when a plurality of first AV data D1 is endlessly-recorded in the first recording region 15B of the hard disk 15. Thereby, it can prevent endlessly-recorded first AV data D1 and first AV data D1 to be reproduced from overlapping each other and store second AV data D4 before new first or second AV

data D1 or D4 is overwritten on the previously-recorded second AV data D4.

The above structure comprises the CPU 8 for endlessly-recording a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15 and successively reproducing the endlessly-recorded first AV data D1, the control panel 4 for inputting the start and end points of a desired image and/or voice corresponding to the second AV data D4 out of images and/or voices corresponding to the first AV data D1 reproduced by the CPU 8, and the system controller 2 for controlling the CPU 8 so as to endlessly-record a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15 on the basis of the designated start and end points while avoiding the recording region for the second AV data D4. Thereby, it is possible to store the second AV data D4 without replacing the hard disk 15 even when endlessly-recording the second AV data D4 together with the first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15 and thus, realize a recording apparatus capable of easily storing desired second AV data D4 while endlessly-recording the first AV data D1.

Moreover, it is possible to store the second AV data D4 without replacing the hard disk 15 because of endlessly-recording a plurality of first AV data D1 in the first recording region of the AV data recording region 15B of the hard disk 15, successively

reproducing the endlessly-recorded first AV data D1 to designate the start and end points of a desired image and/or voice corresponding to the second AV data D4 out of images and/or voices corresponding to the first AV data D1 and then, endlessly-recording the first AV data values D1 in the first recording region of the AV data recording region 15B of the hard disk 15 on the basis of the designated start and end points while avoiding the recording region for the second AV data D4. Thus, it is possible to realize a recording method capable of easily storing desired second AV data D4 while endlessly-recording the first AV data D1.

Note that, while in the aforementioned embodiment, the hard disk 15 is used as a recording medium for endlessly-recording first AV data D1, however, the present invention is not limited thereto and various recording mediums; a recording medium capable of non linear access such as a disc recording medium and a memory other than the hard disk 15 can be used.

Further, while in the aforementioned embodiment, a plurality of first AV data D1 is endlessly-recorded in a hard disk 15 and moreover the first AV data is reproduced, and a user recognizes the contents of images and/or voices corresponding to the first AV data D1 to designate the start point and end point of a desired image and/or voice. However, the present invention is not limited thereto and it is also possible to allow a user to recognize the contents of images and/or voices corresponding to first data to designate the start point and end point of second AV data D4 corresponding to a

desired image and/or voice before endlessly-recording first AV data D1 and thereafter, generate file data D5 for recognizing the second AV data D4 to record the file data D5 together with the second AV data D4 in the hard disk 15 while endlessly-recording the first AV data D1 in the hard disk 15. Thereby, it is possible to apply a recording/reproducing apparatus of the present invention to various types of recording/reproducing apparatuses such as a cam coder and improve the versatility of the recording/reproducing apparatus.

Further, while in the aforementioned embodiment, first and second AV data D1 and D4 comprising images and/or voices are used as data to be endlessly-recorded in a recording medium, however, the present invention is not limited thereto and various types of data such as data showing characters can be used.

Furthermore, while in the aforementioned embodiment, a plurality of first AV data D1 are successively reproduced in recorded order of the data after a predetermined time when the first AV data D1 has been endlessly-recorded in the first recording regions FS1 to FS3 (Fig. 3B) of the AV data recording region 15B of the hard disk 15. However, the present invention is not limited thereto and it is possible to start the endless-recording and reproducing of the first AV data D1 in the first recording regions FS1 to FS3 from any logical address as long as the first AV data D1 to be endlessly-recorded is not overlapped with the first AV data D1 to be reproduced in the recording regions FS1 to FS3 of the AV data recording region 15B of the hard disk 15 and the first AV data D1

can be reproduced before any data is overwritten on the first AV data D1.

Furthermore, while in the aforementioned embodiment, the control panel 4 is used as input means for inputting the start and end points of desired second data D4 out of first data D1 to be recorded or already recorded in the recording medium 15 by recording means 8. However, the present invention is not limited thereto and any other input means can be used such as a user interface, as long as the start and end points of desired second data D4 can be input out of first data D1 to be recorded or already recorded in the recording medium 15 by the recording means 8.

Furthermore, while in the aforementioned embodiment, the system controller 2 is used as control means for controlling the recording means 8, when the start and end points of second data D4 are designated through input means 4, so as to endlessly-record first data D1 in the recording medium 15 while avoiding the recording region of the recording medium 15 in which the second AV data D4 has been recorded. However, the present invention is not limited thereto and any other control means can be used as long as, when the start and end points of the second data D4 are designated through the input means 4, the recording means 8 can be controlled so as to endlessly-record the first data D1 in the recording medium 15 while avoiding the recording region of the recording medium 15 in which the second data D4 has been recorded.

Furthermore, while in the aforementioned embodiment, a display

unit and speaker are used as recognition means for allowing a user to recognize the contents of first data D1 and second data D4 reproduced by regeneration means 8. However, the present invention is not limited thereto and any other recognition means can be used as long as a user can recognize the contents of the first data D1 and second data D4 reproduced by the regeneration means 8.

As described above, the present invention comprises recording means for endlessly-recording successively-input first data in a recording medium, input means for inputting the start and end points of desired second data out of first data to be recorded or already recorded in the recording medium by the recording means, and control means, when the start and end points of second data through the input means, for controlling the recording means so as to endlessly-record the first data in the recording medium while avoiding the recording region of the recording medium in which the second data has been recorded. Therefore, the second data is endlessly-recorded together with the first data without replacing the recording medium and moreover the second data can be stored. Thus, it is possible to realize a recording apparatus capable of easily storing the second data while endlessly-recording the first data in the recording medium.

Further, while successively-input first data are endlessly-recorded in a recording medium, the start and end points of desired second data are recorded out of the first data to be recorded or already recorded in the recording medium when the start and end

points of the desired second data are designated, and then the first data are endlessly-recorded in the recording medium on the basis of the recorded start and end points while avoiding the recording region of the recording medium in which the second data is recorded. Thereby, the second data can be stored without replacing the recording medium. Thus, it is possible to realize a recording method capable of easily storing the second data while endlessly-recording the first data in the recording medium.

While there has been described in connection with the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be aimed, therefore, to cover in the appended claims all such changes and modifications as fall within the true spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. A recording apparatus comprising:

recording means for recording input first data in a recording medium;

input means for inputting a start point and end point of desired second data out of said first data to be recorded or already recorded in said recording medium by said recording means; and

control means, when said start point and end point of said second data are designated through said input means, for controlling said recording means so as to endlessly-record said first data in said recording medium while avoiding the recording region of said recording medium in which said second data has been recorded.

2. The recording apparatus according to claim 1, wherein

said recording medium is a recording medium capable of non linear access.

3. The recording apparatus according to claim 1, further comprising

reproducing means for reproducing said first data recorded in said recording medium, wherein

said start point and end point of said desired second data are input by input means from said first data reproduced by said reproducing means.

4. The recording apparatus according to claim 3, wherein
said reproducing means reproduces said first data recorded in
said recording medium after a passage of a predetermined time in
order of recording said first data in said recording medium.
5. The recording apparatus according to claim 1, wherein
said control means, when said recording means is controlled so
as to endless-record said data in said recording medium, endless-
records said first data in a first region of said recording medium,
and when said start point and end point of said second data are
input through said input means, controls said recording means so as
to endless-record said first data in said first region while
avoiding a predetermined second region out of said first region of
said recording medium.
6. The recording apparatus according to claim 1, wherein
said control means controls said recording means so as to
record said first data in a first region of said recording medium,
and controls said recording means so as to generate assisting data
for identifying said first data and record the assisting data in a
second region different from said first region of said recording
medium.
7. The recording apparatus according to claims 1 and 3, wherein
said control means controls said recording means so as to

record said first data in a first region of said recording medium; controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium; further controls said reproducing means so as to reproducing said assisting data recorded in said second region of said recording medium when reproducing said first data by said reproducing means; and when said start point and end point of said second data are input by said input means, controls said recording means so as to generate said assisting data corresponding to said start point and end point and record said assisting data in said second region of said recording medium.

8. The recording apparatus according to claim 6 and/or claim 7, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded.

9. A recording/reproducing apparatus for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprising:

recording means for recording input first data in said recording medium;

input means for inputting a start point and end point of desired second data out of said first data to be recorded or already recorded in said recording medium by said recording means;

control means, when said start point and end point of said second data are input through said input means, for controlling said recording means so as to endlessly-record said first data in said recording medium while avoiding the recording region of said recording medium in which said second data has been recorded; and

reproducing means for reproducing and outputting said first data recorded in said recording medium.

10. The recording/reproducing apparatus according to claim 9, wherein

the start point and end point of said desired second data are input by said input means from said first data reproduced by said reproducing means.

11. The recording/reproducing apparatus according to claim 9, wherein

said reproducing means reproduces said first data recorded in said recording medium after a passage of a predetermined time in order of recording said first data in said recording medium.

12. The recording/reproducing apparatus according to claim 9, wherein

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said control means, when controlling said recording means so as to endlessly-record said first data in said recording medium, endless-records said first data in a first region of said recording medium, and when said start point and end point of said second data are input through said input means, controls said recording means so as to endlessly-record said first data in said first region while avoiding a predetermined second region out of said first region of said recording medium (endlessly-recording in a predetermined region on a HD) .

13. The recording/reproducing apparatus according to claim 9, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium, and controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a second region different from said first region of said recording medium (recording in a predetermined region of a file system HD) .

14. The recording/reproducing apparatus according to claim 9, wherein

said control means controls said recording means so as to record said first data in a first region of said recording medium; controls said recording means so as to generate assisting data for identifying said first data and record the assisting data in a

second region different from said first region of said recording medium; further controls said reproducing means so as to reproduce said assisting data recorded in said second region of said recording medium when said first data is reproduced by said reproducing means; and when said start point and end point of said second data are input by said input means, controls said recording means so as to generate said assisting data corresponding to said start point and end point and record said assisting data in said second region of said recording medium (file system renewal).

15. The recording/reproducing apparatus according to claims 13 and 14, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a size of said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data are recorded (contents of file system).

16. A recording method for recording input first data in a recording medium capable of non linear access, comprising:

first step of endlessly-recording said first data in said recording medium and inputting a start point and/or end point of desired second data out of said first data to be recorded or already recorded in said recording medium; and

second step, when said start point and/or end point of said

desired second data are/is input at said first step, of endlessly-recording said first data in said recording medium while avoiding a recording region of said recording medium in which said second data corresponding to said start point and/or end point out of said first data has been recorded.

17. The recording method according to claim 16, wherein

said first step reproduces said first data endlessly-recorded in said recording medium, and inputs said start point and end point of said desired second data from said reproduced first data.

18. The recording method according to claim 17, wherein

said first step reproduces said endlessly-recorded first data after a passage of a predetermined time, and inputs said start point and/or end point of said desired second data from said reproduced first data.

19. The recording method according to claim 16, wherein:

said first step endlessly-records said first data in a first region of said recording medium; and

said second step, when said start point and/or end point of said desired second data are/is input at said first step, endlessly-records said first data in said first region while avoiding said second region of said recording medium in which said second data corresponding to said start point and/or end point out of said first

data has been recorded (endlessly-recording in a predetermined region of HD).

20. The recording method according to claim 16, wherein
said first step endlessly-records said first data in said first region of said recording medium, generates assisting data for identifying said first data, and records the assisting data in a second region different from said first region of said recording medium (recording in a predetermined region of file system HD).

21. The recording method according to claims 16 and 17, wherein:
said first step endlessly-records said first data in a first region of said recording medium, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when reproducing said first data, reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or end point of said desired second data are/is input at first step, generates said assisting data corresponding to said start point and/or end point, and records said assisting data in said second region of said recording medium (file system renewal).

22. The recording method according to claim 20 and/or claim 21, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

23. A recording/reproducing method for recording input data in a recording medium capable of non linear access, and reproducing and outputting the recorded data, comprising:

first step of endlessly-recording input first data in said recording medium, and inputting a start point and/or end point of desired second data out of first data to be recorded or already recorded in said recording medium;

second step, when said start point and/or end point of said desired second data are input at first step, of endlessly-recording said first data in said recording medium while avoiding a recording region of said recording medium in which second data corresponding to said start point and/or end point out of said first data has been recorded; and

third step of reproducing and outputting said first data recorded in said recording medium.

24. The recording/reproducing method according to claim 23, wherein

said start point and/or end point of said desired second data are/is input at said first step from said first data reproduced at

said third step.

25. The recording/reproducing method according to claim 24,
wherein

said third step reproduces said first data endlessly-recorded
in said recording medium after passage of a predetermined time, and
inputs said start point and/or end point of said desired second data
from said reproduced first data.

26. The recording/reproducing method according to claim 23,
wherein:

said first step endlessly-records said first data in a first
region of said recording medium; and

said second step, when said start point and/or end point of
said desired second data are/is input at said first step, endlessly-
records said first data in said first region while avoiding said
second region of said recording medium in which said second data
corresponding to said start point and/or end point out of said first
data has been recorded (endlessly-recording in a predetermined
region of HD).

27. The recording/reproducing method according to claim 23,
wherein

said first step endlessly-records said first data in a first
region of said recording medium, generates assisting data for

identifying said first data, and records the assisting data in a second region different from said first region of said recording medium (recording in a predetermined region of file system HD).

28. The recording/reproducing method according to claims 23 and 24, wherein:

said first step endlessly-records said first data in a first region of said recording region, generates assisting data for identifying said first data, which is recorded in a second region different from said first region of said recording medium, and further, when said first data is reproduced at said third step, also reproduces said assisting data recorded in said recording medium; and

said second step, when said start point and/or end point of said desired second data are/is input at said first step, generates said assisting data corresponding to said start point and/or end point and records said assisting data in said second region of said recording medium (file system renewal).

29. The recording/reproducing method according to claim 27 and/or claim 28, wherein

said assisting data comprises a file name corresponding to said first and/or second data, a time code added to said first and/or second data, and a head address of said recording medium in which said first and/or second data has been recorded.

ABSTRACT OF THE DISCLOSURE

In recording, reproducing, and recording/reproducing apparatuses and methods thereof, while endlessly-recording first data, desired second data can be easily stored. The present invention comprises recording means for endlessly-recording the first data in a recording medium, input means for inputting a start and end point of the second data out of the first data, and control means, when the start point and end point are designated, for controlling the recording means so as to endlessly-record the first data while avoiding a recording region for the second data. Thereby, the second data can be stored without replacing the recording medium even if the second data is endlessly-recorded. In addition, when the start point and end point of the desired second data out of the first data are designated, the start point and end point are recorded, and then the first data is endlessly-recorded based on the recorded start point and end point while avoiding the recording region for the second data. Thereby, the second data can be stored without replacing the recording medium.

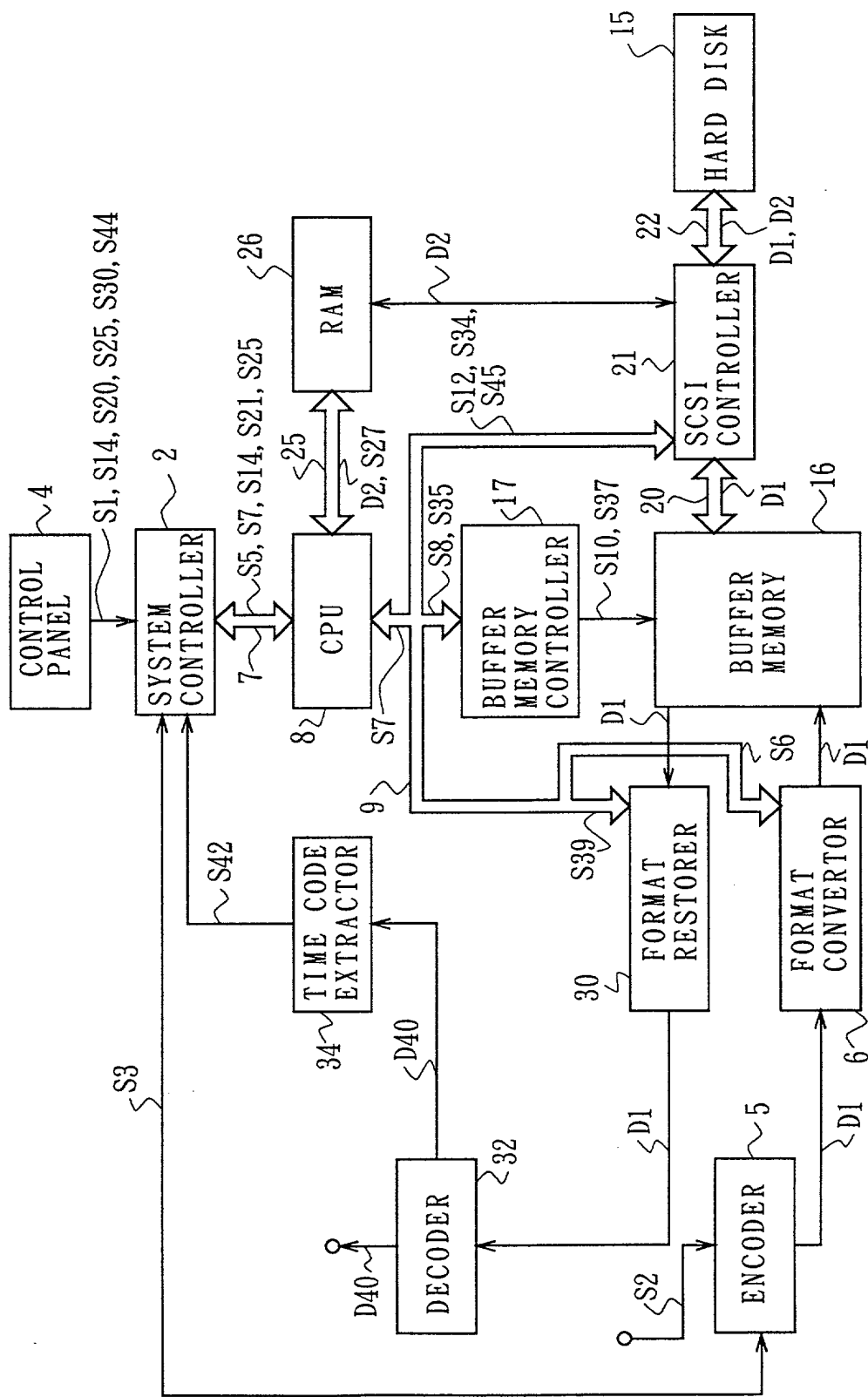


FIG. 1

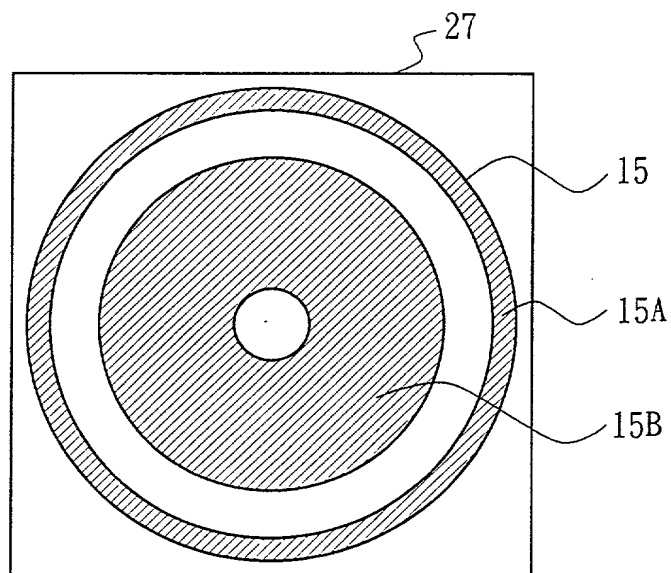


FIG. 2

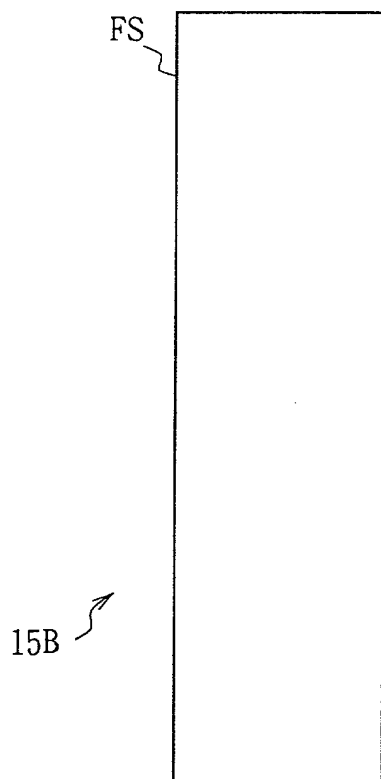


FIG. 3A

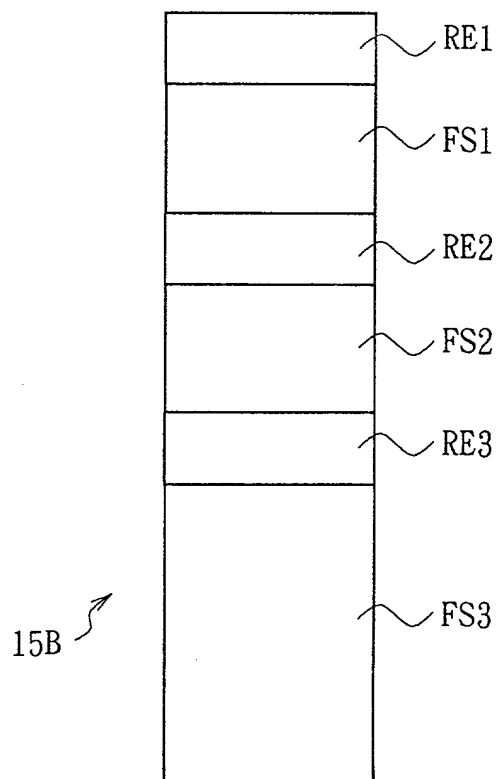


FIG. 3B

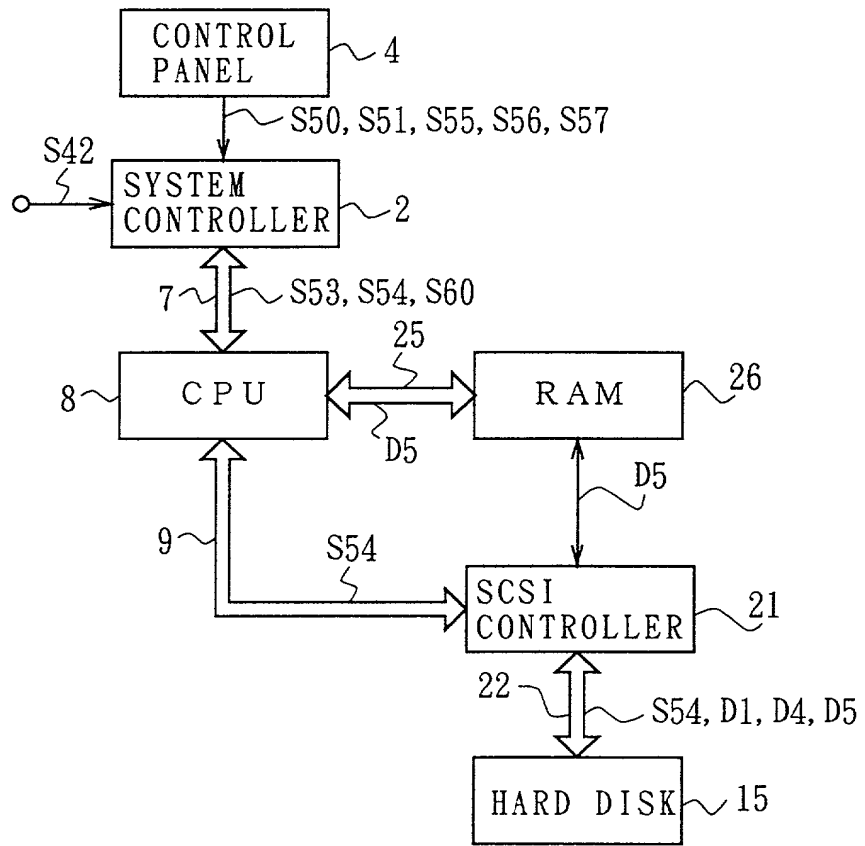


FIG. 4

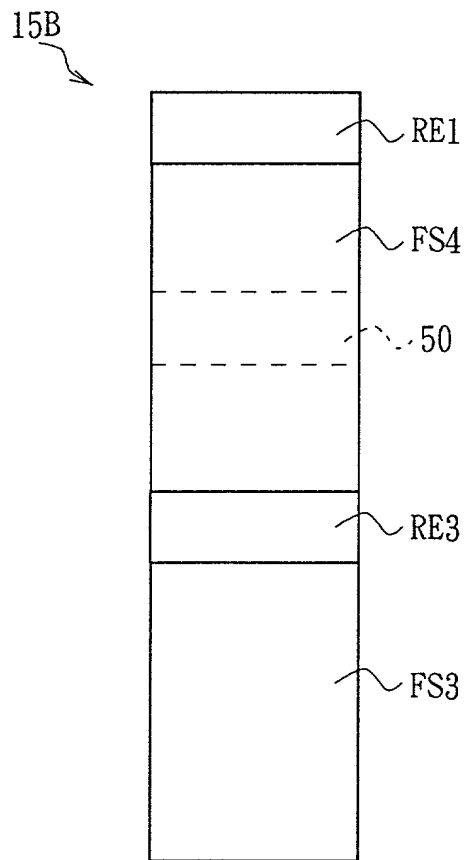


FIG. 5A

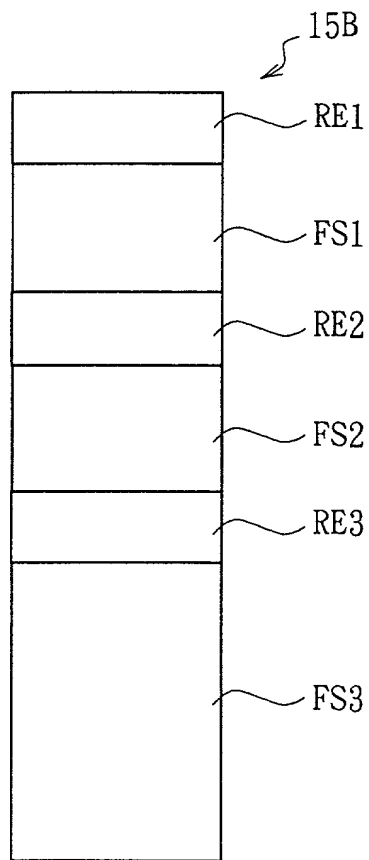


FIG. 5B

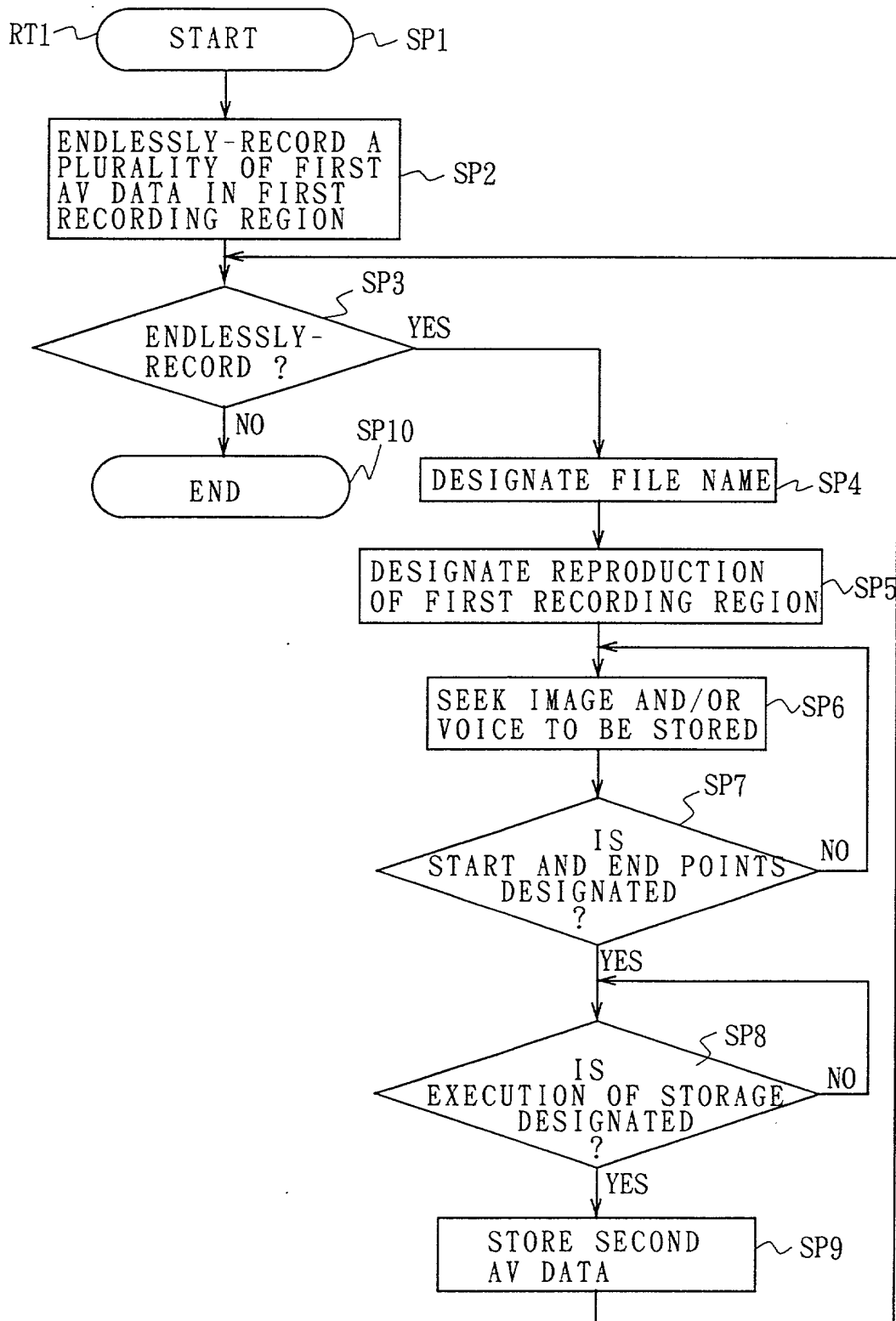


FIG. 6

SONY-P7698

Declaration and Power of Attorney For Patent Application

特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明者として、以下のとおり宣言する：

私の住所、郵便の宛先および国籍は、下欄に氏名に続いて記載したとおりであり、

名称の発明に関し、請求の範囲に記載した特許を求める主題の本来の、最初にして唯一の発明者である（一人の氏名のみが下欄に記載されている場合）か、もしくは本来の、最初にして共同の発明者である（複数の氏名が下欄に記載されている場合）と信じ、

その明細書を
(該当する方に印を付す)

- ☐ ここに添付する。
- ☐ _____ 日に出願番号
第 _____ 号として提出し、
_____ 日に補正した。
(該当する場合)

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

私は、連邦規則法典第37部第1章第56条(a)項に従い、本願の審査に所要の情報を開示すべき義務を有することを認める。

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

RECORDING, REPRODUCING, AND

RECORDING/REPRODUCING APPARATUSES

AND METHODS THEREOF

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration

私は、合衆国法典第35部第119条にもとづく下記の外国特許出願または発明者証出願の外国優先権利益を主張し、さらに優先権の主張に係わる基盤出願の出願日前の出願日を有する外国特許出願または発明者証出願を以下に明記する：

Prior foreign applications
先の外国出願

P08-229308	Japan	12 August 1996
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)
_____	_____	_____
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)
_____	_____	_____
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)
_____	_____	_____

Priority claimed
優先権の主張

<input checked="" type="checkbox"/> Yes あり	<input type="checkbox"/> No なし
<input type="checkbox"/> Yes あり	<input type="checkbox"/> No なし
<input type="checkbox"/> Yes あり	<input type="checkbox"/> No なし

私は、合衆国法典第35部第120条にもとづく下記の合衆国特許出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第35部第112条第1項に規定の様態で先の合衆国出願に開示されていない限度において、先の出願の出願日と本願の国内出願日またはPCT国際出願日の間に公表された、連邦規則法典第37部第1章第56条に記載の、特許性に対し重要である全ての情報を米国特許商標庁に開示すべき義務を有することを認める：

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (出願番号)	(Filing Date) (出願日)
_____	_____
(Application Serial No.) (出願番号)	(Filing Date) (出願日)
_____	_____

(現況) (特許済み、係属中、放棄済み)	(Status) (patented, pending, abandoned)
_____	_____

(現況) (特許済み、係属中、放棄済み)	(Status) (patented, pending, abandoned)
_____	_____

私は、ここに自己の知識にもとづいて行った陳述がすべて真実であり、自己の有する情報および信ずるところに従って行った陳述が真実であると信じ、さらに故意に虚偽の陳述等を行った場合、合衆国法典第18部第1001条により、罰金もしくは禁錮に処せられるか、またはこれらの刑が併科され、またかかる故意による虚偽の陳述が本願ないし本願に対して付与される特許の有効性を損うことがあることを認識して、以上の陳述を行ったことを宣言する。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration

委任状：私は、下記発明者として、以下の代理人をここに選任し、本願の手続を遂行すること並びにこれに関する一切の行為を特許商標庁に対して行うことを委任する。
(代理人氏名および登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number.)

I HEREBY APPOINT THE FOLLOWING AS MY ATTORNEYS WITH FULL POWER OF SUBSTITUTION TO PROSECUTE THIS APPLICATION AND TRANSACT ALL BUSINESS IN THE PATENT OFFICE CONNECTED THEREWITH:

Karl A. Limbach	18,689	Stephen M. Everett	30,050	Patricia Coleman James	37,155
George C. Limbach	19,305	Alfred A. Equitz	30,922	Alan A. Limbach	39,749
John K. Uilkema	20,282	W. Patrick Bengtsson	32,456	Douglas C. Limbach	35,249
J. William Wigert, Jr.	24,582	Mark A. Della Valle	34,147	Brian J. Keating	39,520
Philip M. Shaw, Jr.	25,376	Charles P. Sammut	28,901	Seong-Kun Oh*	
Neil A. Smith	25,441	Richard A. Nebb	33,540	J. Thomas McCarthy	22,420
Veronica C. Devitt	29,375	Richard E. Wawrzyniak	36,048	Michael R. Ward	38,651
Ronald L. Yin	27,607	Alan D. Minsk	35,956	Steven M. Santisi	40,157
Gerald T. Sekimura	30,103	Mark C. Pickering	36,239	Philip D. Reilly	P-41,415
Michael A. Stallman	29,444	Kathleen A. Frost	37,326		
Philip A. Girard	28,848	Alan S. Hodes	38,185		
Michael J. Pollock	29,098				

Send correspondence to:
Philip M. Shaw, Jr., Esq.
LIMBACH & LIMBACH L.L.P.
2001 Ferry Building
San Francisco, CA 94111-4262

直通電話連絡先：(名称および電話番号)

Direct Telephone Calls to: (name and telephone number)

Philip M. Shaw, Jr.
(415) 433-4150

唯一のまたは第一の発明者の氏名	Full name of sole or first inventor
同発明者の署名	Inventor's signature
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address
第2の共同発明者の氏名 (該当する場合)	Full name of second joint inventor, if any
同第2発明者の署名	Second inventor's signature
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address

(第六またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。)

(Supply similar information and signature for third and subsequent joint inventors.)